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**APPLICATION NUMBER: 60/542,161**

**FILING DATE: February 05, 2004**

**RELATED PCT APPLICATION NUMBER: PCT/US05/03643**



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PTO/SB/16 (05-99)

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# PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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020504

INVENTOR(S)					
Given Name (first and middle [if any])		Family Name or Surname		Residence (City and either State or Foreign Country)	
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Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
MIRROR RETENTION SYSTEM					
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<input type="checkbox"/> Customer Number		<div></div>		<div>Place Customer Number Bar Code Label here</div>	
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<input checked="" type="checkbox"/> Firm or Individual Name		John A. Miller - Warn, Burgess & Hoffmann, P.C.			
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/>	Specification	Number of Pages	15	<input type="checkbox"/>	CD(s), Number
<input checked="" type="checkbox"/>	Drawing(s)	Number of Sheets	7	<input checked="" type="checkbox"/>	Other (specify)
<input checked="" type="checkbox"/>	Application Data Sheet. See 37 CFR 1.76				
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METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input type="checkbox"/>	Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE AMOUNT (\$)
<input type="checkbox"/>	A check or money order is enclosed to cover the filing fees.				\$160.00
<input checked="" type="checkbox"/>	The Director is hereby authorized to charge any additional filing fees or credit any overpayment to Deposit Account Number: 500906				
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/>	No.				
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[Page 1 of 2]

Respectfully submitted,

SIGNATURE

*John A. Miller*

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TELEPHONE (248) 364-4300

Date 2/5/04

REGISTRATION NO.

(If appropriate)

Docket Number:

34985

SCH-00084

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# FEE TRANSMITTAL for FY 2004

*Effective 10/01/2003. Patent fees are subject to annual revision.*

☐ Applicant claims small entity status. See 37 CFR 1.27

**TOTAL AMOUNT OF PAYMENT** (\$ ) 160.00

## Complete if Known

Application Number	
Filing Date	
First Named Inventor	Paul R. Henion
Examiner Name	
Art Unit	
Attorney Docket No.	SCH-00084

### METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 500906  
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### FEE CALCULATION

#### 1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	160.00
<b>SUBTOTAL (1)</b>					<b>(\$ ) 160.00</b>

#### 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims		-20** =		X		=	0.00
Independent Claims		-3** =		X		=	0.00
Multiple Dependent						=	0.00

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1202	18	2202	9	Claims in excess of 20	
1201	86	2201	43	Independent claims in excess of 3	
1203	290	2203	145	Multiple dependent claim, if not paid	
1204	86	2204	43	** Reissue independent claims over original patent	
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent	
<b>SUBTOTAL (2)</b>					<b>(\$ ) 0.00</b>

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### FEE CALCULATION (continued)

#### 3. ADDITIONAL FEES

Large Entity Small Entity

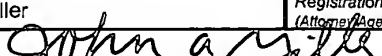
Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify)

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**SUBTOTAL (3)** (\$ ) 0.00

#### SUBMITTED BY

Name (Print/Type)	John A. Miller	Registration No. (Attorney/Agent)	34985	Telephone	(248) 364-4300
Signature		Date	February 5, 2004		

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## MIRROR RETENTION SYSTEM

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

**[0001]** This invention relates generally to a positioning mechanism for a side mirror of a vehicle and, more particularly, to a positioning assembly including a single piece plastic retention ring for manually positioning a spotter mirror associated with a vehicle side mirror assembly.

#### 2. Discussion of the Related Art

**[0002]** Vehicles employ side mirrors that allow the vehicle operator to see behind and to the side of the vehicle. State of the art side mirrors are sometimes elaborate assemblies that including various options and features that increase the operator's ability to see objects, more safely operate the vehicle, provide a more aesthetically pleasing appearance, etc. In one known vehicle side mirror design, the side mirror assembly includes an upper normal viewing mirror and a lower spotter mirror providing a narrower field of view. It is known in the art to provide various mechanisms and devices to manually adjust the spotter mirror so that it is pointed in the proper direction for a particular vehicle operator. These known devices and mechanisms typically include multiple parts, including metal pieces, that need to be assembled together to provide the positioning operation. Further, the known positioning devices cannot be taken apart to be serviced. It is desirable to reduce the number of parts in a vehicle side spotter mirror to reduce assembly time, complexity, cost, weight, etc., and allow the mirror to be serviceable.

## SUMMARY OF THE INVENTION

**[0003]** In accordance with the teachings of the present invention, a vehicle rearview side mirror is disclosed that employs a spotter mirror assembly including a positioning mechanism for directing the mirror. The side mirror includes an internal case frame having a spherical concave support portion and a "T-shaped" retention post extending from a center area of the support portion. The spotter mirror assembly includes a backing plate having an extended dish portion with a center opening. The backing plate is positioned against the case frame so that the support portion and the dish portion nest together and the post extends through the opening in the dish portion. The spotter mirror assembly further includes a single piece plastic retention ring having a cam locking portion and leaf springs. The retention ring is positioned within the dish portion so that the retention post extends through a center slot in the ring.

**[0004]** The retention ring is rotated so that ramped cam surfaces of the cam locking portion push against a back surface of the tip of the post. The ramped surfaces force the leaf springs against the inside surface of the dish portion. The tip of the post is locked in a détente position to rigidly secure the backing plate to the case frame. A spotter mirror glass is mounted to the backing plate. The backing plate and glass can be manually adjusted by rotating the dish portion on the support portion to adjust the viewing direction of the mirror glass.

**[0005]** Additional advantages and features of the present invention will become apparent from the following description and appended claims, taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]** Figure 1 is a perspective view of a vehicle side mirror assembly including a spotter mirror assembly, according to an embodiment of the present invention;

**[0007]** Figure 2 is an exploded perspective view of the spotter mirror assembly of the side mirror assembly shown in figure 1;

**[0008]** Figure 3 is a front view of the spotter mirror assembly of the invention with the mirror glass removed;

**[0009]** Figure 4 is an exploded cross-sectional view showing a retention ring of the spotter mirror assembly of the invention;

**[0010]** Figure 5 is a cross-sectional view of the spotter mirror assembly through line 5-5 in figure 3;

**[0011]** Figure 6 is a front view of the spotter mirror assembly of the invention with the mirror glass removed showing the cam locking feature of the retention ring;

**[0012]** Figure 7 is a cross-sectional view of the spotter mirror assembly of the invention through line 7-7 in figure 6; and

**[0013]** Figures 8 and 9 are cross-sectional views of the spotter mirror assembly of the invention showing adjustment positions of the mirror assembly.

#### DETAILED DISCUSSION OF THE EMBODIMENTS

**[0014]** The following discussion of the embodiments of the invention directed to a positioning mechanism for a spotter mirror assembly is merely exemplary in nature, and is in no way intended to limit the invention or its applications or uses.

**[0015]** Figure 1 is a perspective view of a vehicle side mirror assembly 10 mounted to the side of a vehicle 12. The side mirror assembly 10 includes a mirror housing 14 mounted to the vehicle 12 by mounting rods 16 and 18. The housing 14 can be mounted to the rods 16 and 18, and the rods 16 and 18 can be mounted to the vehicle 12 by any suitable technique that is applicable for a particular design. For example, the side mirror assembly 10 can include mechanisms to allow the assembly 10 to be folded, both forward and backward, and the housing 14 can be moved in and out on telescoping mechanisms associated with the rods 16 and 18. The side mirror assembly 10 includes a normal viewing side mirror glass 20 that can be positioned for directional viewing purposes electrically or manually, as is well known in the art.

**[0016]** According to the invention, the side mirror assembly 10 includes a spotter mirror assembly 28 positioned below the normal viewing mirror glass 20, as shown. The discussion below of the spotter mirror assembly 28 is



not limited to a spotter mirror for a vehicle side mirror, or a spotter mirror in combination with another mirror. The features of the spotter mirror assembly 28 of the invention have application for directing any suitable mirror. Further, as will become apparent from the discussion below, the features of the spotter mirror assembly 28 of the invention allow the assembly 28 to be taken apart for servicing.

**[0017]** Figure 2 is an exploded perspective view of the side mirror assembly 28. The side mirror assembly 10 includes an internal support case frame 30 positioned with the housing 14 that is molded of a suitable plastic material. The case frame 30 includes extended members 32 and 34 extending from a base plate 36 that are molded with the case frame 30 and define a spherical concave surface 38. A retention post 40 is mounted to the base plate 36 between the members 32 and 34 at a center location of the spherical surface 38. The post 40 includes an elongated tip 42 so that the post 40 has a "T" shape.

**[0018]** The case frame 30 also includes a first spacing member 46 extending from the base plate 36 at one side of the post 40, as shown. The spacing member 46 includes a U-shaped slot 48 defining end tips 44 and 52. The case frame 30 also includes a second spacing member 50 extending from the base plate 36 at an opposite side of the post 40 from the first spacing member 46.

**[0019]** The spotter mirror assembly 28 includes a backing plate 54 having an extended spherical dish portion 56. A circular opening 58 is provided

at the center of the dish portion 56. The backing plate 54 also includes a rectangular opening 60 adjacent to the dish portion 56. An aligning bar 64 extends across the opening 60 and is mounted to the dish portion 56, as shown. The backing plate 54 is a single piece molded structure made of a suitable plastic material. An outer mirror glass 86 is positioned over a front of the spotter mirror assembly 28 and can be mounted to a rearward facing surface 88 of the backing plate 54 by double-sided tape or the like.

**[0020]** The spotter mirror assembly 28 also includes a retention ring 66 having a center slot 68 defined by an extended neck portion 70 (figure 4). In one embodiment, the retention ring 66 is a single piece molded plastic member. The retention ring 66 includes opposing ramps 72 and 74 positioned around the slot 68 to provide a cam locking feature as will become apparent from the discussion below. The ramps 72 and 74 define an elongated détente position 76 extending across the slot 68. The retention ring 66 also includes a plurality of symmetrically disposed leaf springs 78 (figure 4), four in this embodiment, extending from an outer rim 80 of the ring 66 towards the backing plate 54. The retention ring 66 also includes a plurality of symmetrically disposed and specially configured openings 82 that accept a tool (not shown) to rotate the retention ring 66 for reasons that will become apparent from the discussion below.

**[0021]** Figure 3 is a front view of the spotter mirror assembly 28 with the mirror glass 86 removed. In this view, the retention ring 66 is in an unlocked orientation. During assembly, the backing plate 54 is positioned against the case frame 30 so that the post 40 extends through the opening 58, and the

dish portion 56 nests with the surface 38 defined by the members 32 and 34. The tips 44 and 52 of the spacing member 46 extend into the opening 60 so that the alignment rod 64 is positioned within the slot 48. Figure 4 is a cross-sectional view showing this step of the assembly process where the backing plate 54 is positioned against the case frame 30. The retention ring 66 secures the backing plate 54 to the case frame 30. The retention ring 66 is oriented relative to the post 40 so that the tip 42 of the post 40 is able to slide through the neck portion 70 within the slot 68. Figure 5 is a cross-sectional view of the retention ring 66 positioned within the dish portion 56 in this orientation.

**[0022]** The retention ring 66 is then rotated 90° clockwise by the tool so that the cam ramps 72 and 74 push against a bottom surface of the tip 42 and force the springs 78 and the rim 80 against the dish portion 56. As the retention ring 66 is rotated, the backing plate 54 is tightly positioned against the case frame 30, and the tip 42 is locked within the détente position 76. Figure 6 is a front view of the spotter mirror assembly 28 with the mirror glass 86 removed and the retention ring 66 in the locked position. Figure 7 is a cross-sectional view through line 7-7 of figure 6 of the spotter mirror assembly 28 showing the retention spring 66 in the locked position. The spotter mirror assembly 28 can also be disassembled by rotating the retention ring 66 90° in the counter-clockwise direction.

**[0023]** The configuration of the retention ring 66 and the backing plate 54 allows the backing plate 54 and mirror glass 86 to be pivoted relative to the case frame 30 to position the viewing direction of the mirror glass 86.

Particularly, by applying manual force to a particular location on the mirror glass 86, the dish portion 56 is able to pivot relative to the surface 38 in two-degrees of freedom. The pressure applied by the leaf springs 78 and the rim 80 to the dish portion 56 holds the backing plate 54 to maintain its position once it is moved. The extended neck portion 70 helps maintain the retention ring 66 at a fixed position relative to the case frame 30 because it is axially aligned with the post 40.

**[0024]** Figure 8 is a cross-sectional view of the spotter mirror assembly 28 showing the backing plate 54 positioned in one orientation and figure 9 is a cross-sectional view of the spotter mirror assembly 28 showing the backing plate 54 in an opposite orientation. The spacing members 46 and 50 define the range of travel of the backing plate 54 in a left-right direction, and the size of the opening 58 define the range of travel of the backing plate 54 relative to the post 40 in an up-down direction.

**[0025]** The foregoing discussion discloses and describes merely exemplary embodiments of the present invention. One skilled in the art will readily recognize from such discussion and from the accompanying drawings and claims that various changes, modifications and variations can be made therein without departing from the spirit and scope of the invention as defined in the following claims.

## CLAIMS

What is claimed is:

1. A mirror assembly comprising:

a case frame defining a concave surface, said case frame including a retention post having an elongated tip;

a backing plate including a support surface and a dish portion having a center opening, said backing plate being positioned against the case frame so that the dish portion cooperates with the concave surface and the post extends through the center opening in the dish portion;

a retention ring, said retention ring including a center slot and a locking portion, said retention post extending through the center slot so that the tip of the post is engaged with the locking portion; and

a mirror glass mounted to the support surface of the backing plate, wherein the backing plate and the mirror glass can be manually positioned by pivoting the dish portion on the concave surface.

2. The mirror assembly according to claim 1 wherein the locking portion includes opposing cam ramps and a détente that accepts the elongated tip, wherein the retention ring is secured to the mirror assembly by inserting the retention post through the slot, rotating the retention ring so that the tip rides along the ramps until the tip is positioned in the détente.

3. The mirror assembly according to claim 1 wherein the retention ring further includes at least one spring element, said at least one spring element applying pressure against the dish portion when the retention ring is locked to the backing plate.

4. The mirror assembly according to claim 3 wherein the at least one spring element is four symmetrically disposed leaf spring elements extending from a rim of the retention ring.

5. The mirror assembly according to claim 1 wherein the retention ring further includes an extended neck portion, said retention post extending through the neck portion.

6. The mirror assembly according to claim 1 wherein the retention ring is a single piece plastic member.

7. The mirror assembly according to claim 1 wherein the case frame includes at least one spacing member having a slot and the backing plate includes an opening and an alignment arm extending across the opening, and wherein the alignment arm is positioned within the slot of the spacing member.

8. The mirror assembly according to claim 1 wherein the post is a T-shaped post.

9. The mirror assembly according to claim 1 wherein the spherical surface of the case frame is defined by members extending from the case frame.

10. The mirror assembly according to claim 1 wherein the retention ring includes a plurality of openings for accepting a tool to rotate the ring within the dish portion.

11. The mirror assembly according to claim 1 wherein the case frame is an internal support structure of a side mirror of a vehicle.

12. The mirror assembly according to claim 11 wherein the mirror assembly is a spotter mirror assembly associated with the side mirror.

13. A vehicle side spot mirror assembly comprising:  
an internal case frame including members defining a concave surface, said case frame further including a T-shaped retention post having an elongated tip;  
a backing plate including a support surface and a dish portion having a center opening, said backing plate being positioned against the case frame so that the dish portion cooperates with the concave surface and the post extends through the center opening in the dish portion;

a single piece plastic retention ring, said retention ring including a center slot, a plurality of symmetrically disposed spring elements, a neck portion and a cam locking system including opposing cam ramps and a détente that accepts the elongated tip, said retention post extending through the neck portion and the center slot so that the tip of the post is engaged with the locking system and the spring elements apply pressure against the dish portion, wherein the retention ring is secured to the mirror assembly by inserting the retention post through the center slot, rotating the retention ring so that the tip rides along the ramps until the tip is locked in the détente; and

a mirror glass mounted to the support surface of the backing plate, wherein the backing plate and the mirror glass can be manually positioned by pivoting the dish portion on the concave surface.

14. The mirror assembly according to claim 13 wherein the case frame includes at least one spacing member having a slot and the backing plate includes an opening having an alignment arm extending across the opening, and wherein the alignment arm is positioned within the slot.

15. The mirror assembly according to claim 13 wherein the retention ring includes a plurality of openings for accepting a tool to rotate the ring within the dish portion.

16. A method of directing a mirror, said method comprising:



providing a case frame including a concave surface and a retention post having an elongated tip;

providing a backing plate including a support surface and a dish portion having a center opening;

positioning the backing plate against the case frame so that the dish portion cooperates with the concave surface and the post extends through the opening in the dish portion;

providing a retention ring including a center slot, at least one spring element and a locking portion;

positioning the retention ring so that the retention post extends through the center slot;

rotating the retention ring so that the tip of the post engages the locking portion and the at least one spring element applies pressure against the dish portion;

mounting a mirror glass to the support surface of the backing plate;

adjusting the position of the backing plate and the mirror glass by pivoting the dish portion on the concave surface.

17. The method according to claim 16 wherein providing a retention ring includes providing opposing cam ramps and a détente that accepts the elongated tip.

18. The method according to claim 16 wherein providing a retention ring includes providing four symmetrically disposed spring elements extending from a rim of the retention ring.

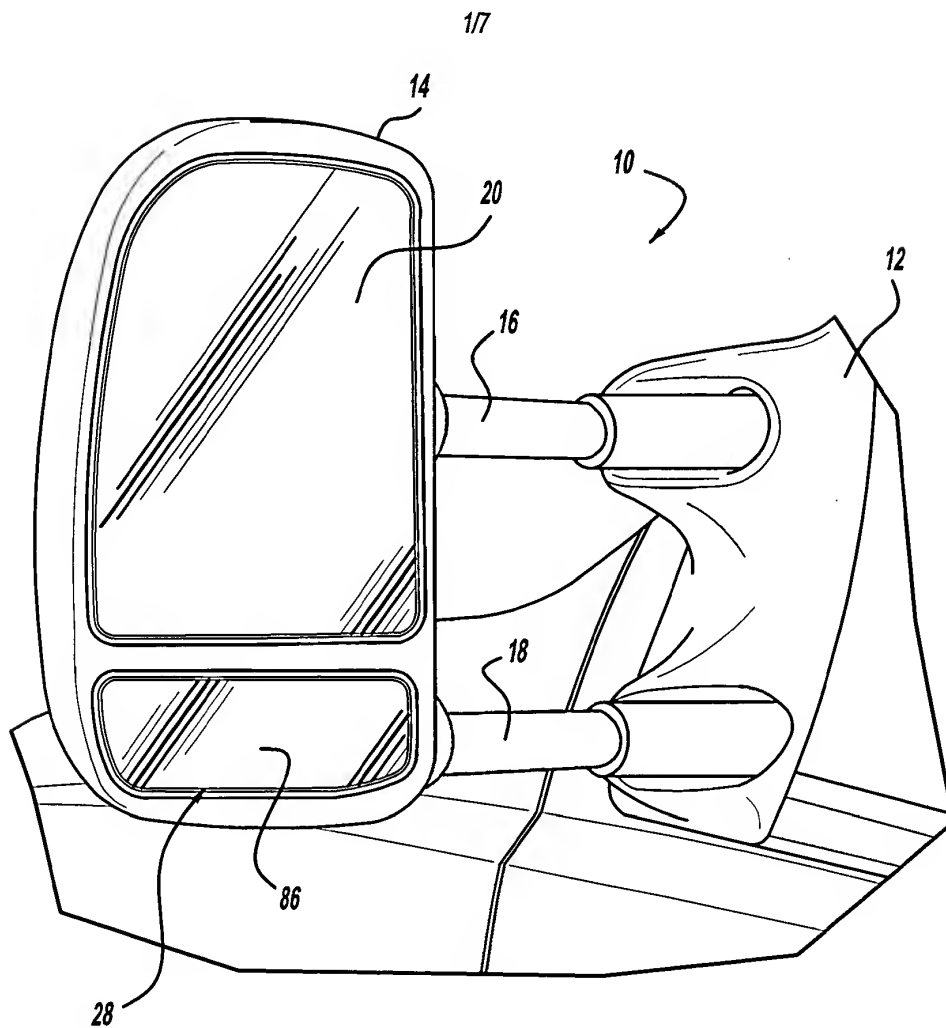
19. The mirror assembly according to claim 16 wherein providing a retention ring includes providing a single piece plastic member.

20. The mirror assembly according to claim 16 wherein providing a case frame includes providing a case frame having at least one spacing member with a slot and providing a backing plate includes providing a backing plate having an opening with an alignment arm extending across the opening, said method further comprising positioning the alignment arm within the slot.

## MIRROR RETENTION SYSTEM

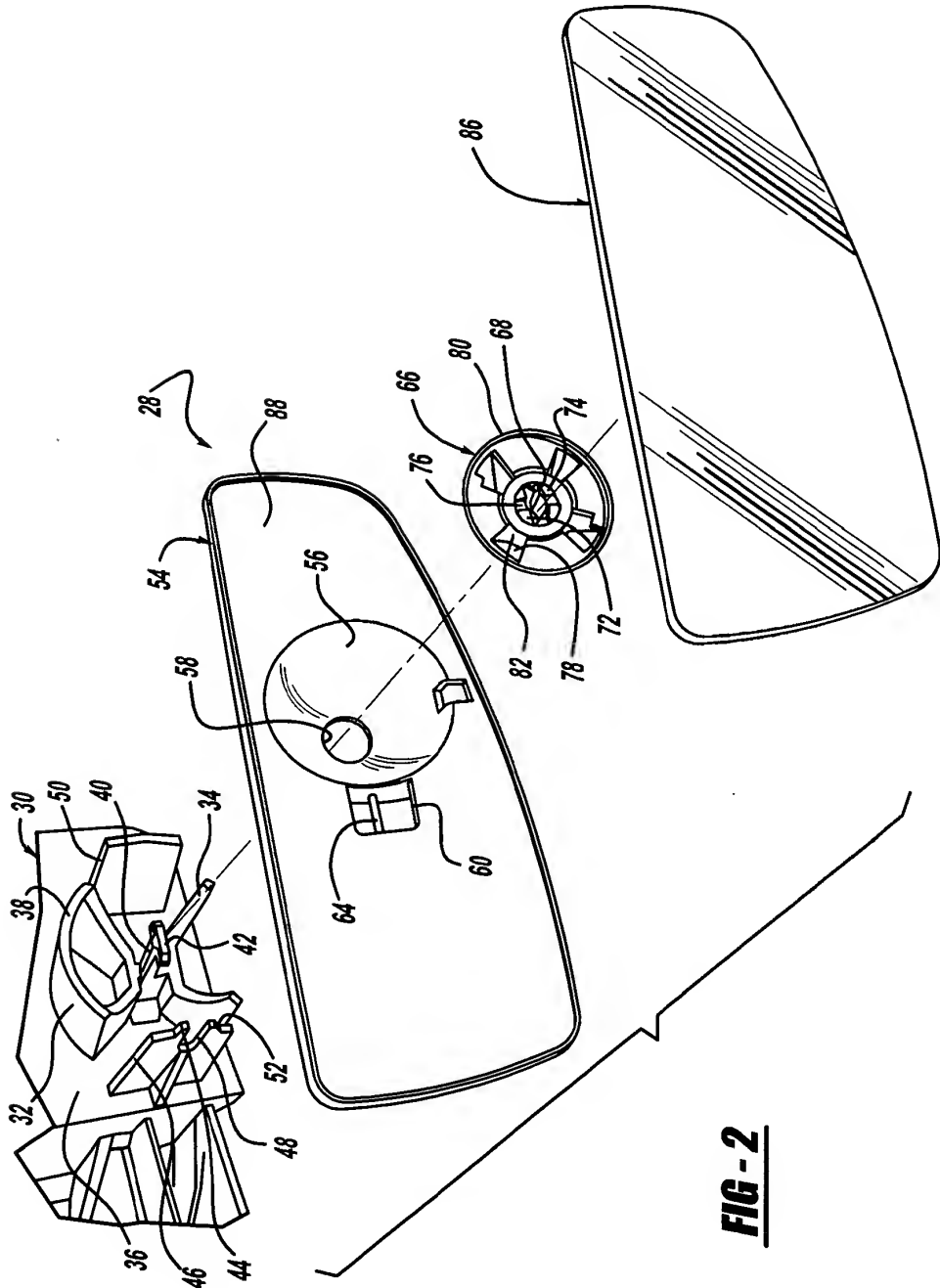
### ABSTRACT OF THE DISCLOSURE

A vehicle side mirror that includes an internal case frame having a spherical concave support portion and a "T-shaped" retention post. The spotter mirror also includes a backing plate having a dish portion with a center opening. The backing plate is positioned against the case frame so that the support portion and the dish portion cooperate and the post extends through the opening in the dish portion. The spotter mirror further includes a single piece retention ring having a cam lock and leaf springs. The retention ring is positioned within the dish portion so that the retention post extends through a center slot in the ring. The retention ring is rotated so that ramped cam surfaces push against a back surface of the post. The pointing direction of the glass can be manually adjusted by rotating the dish portion on the support portion.

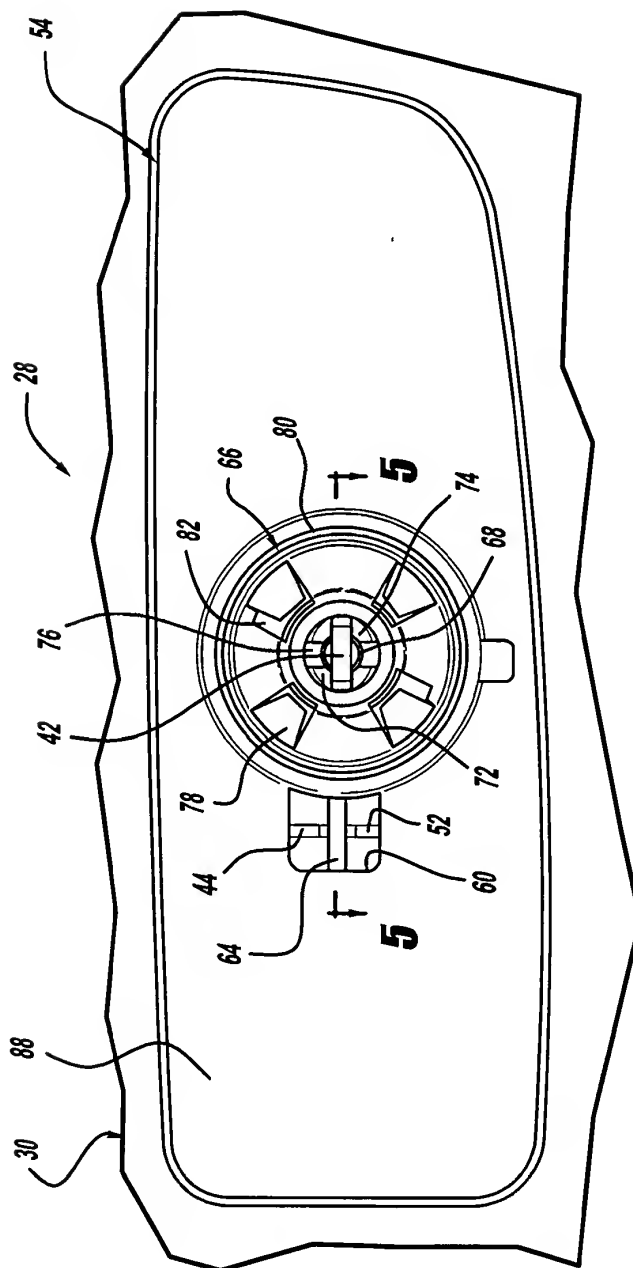


**FIG - 1**

2/7

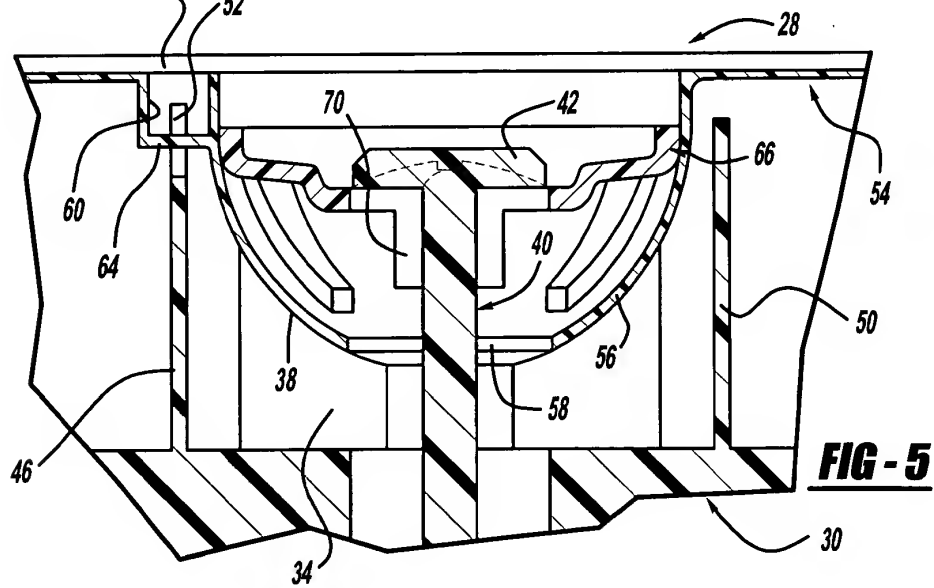
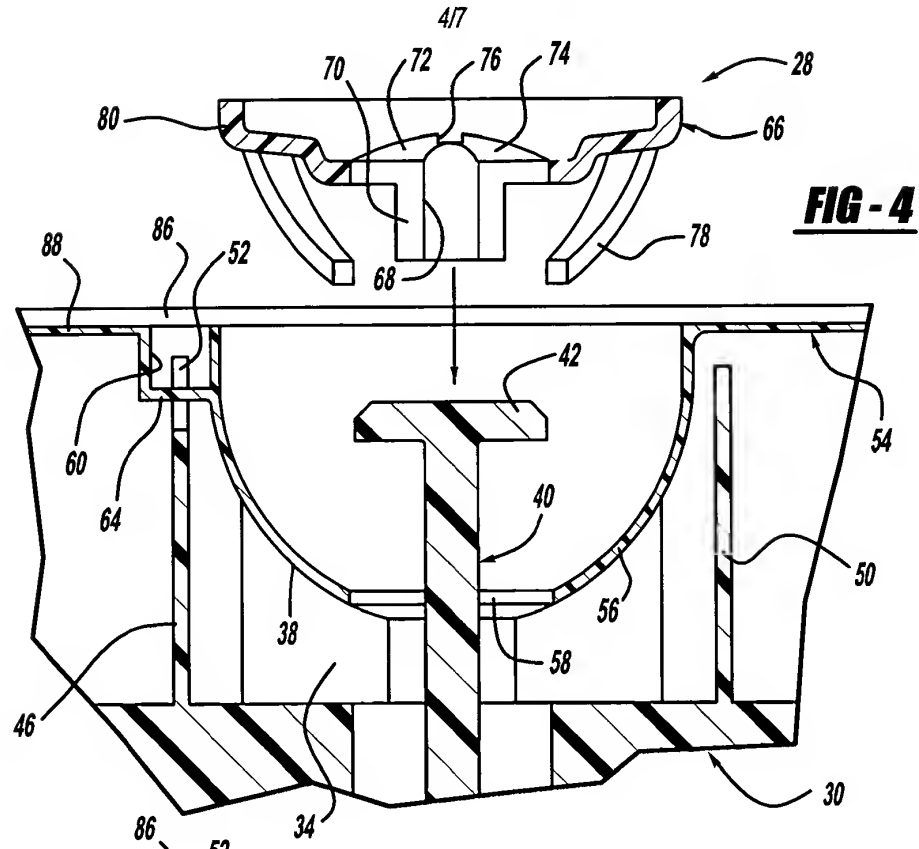


**FIG - 2**



**FIG - 3**

Title: MIRROR RETENTION SYSTEM  
 Inventor (s) : Paul Henion  
 Attorney Docket No. SCH-00084



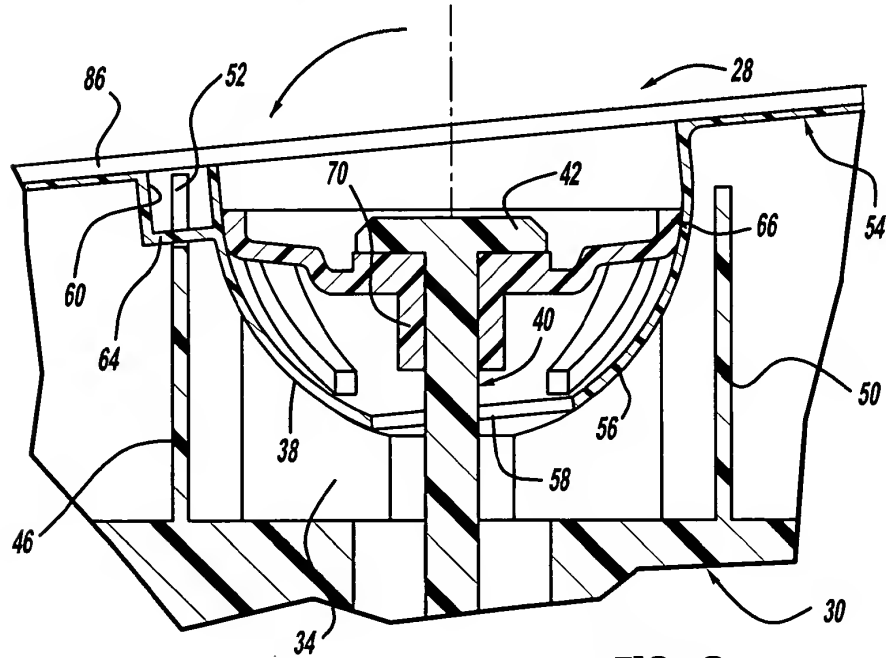
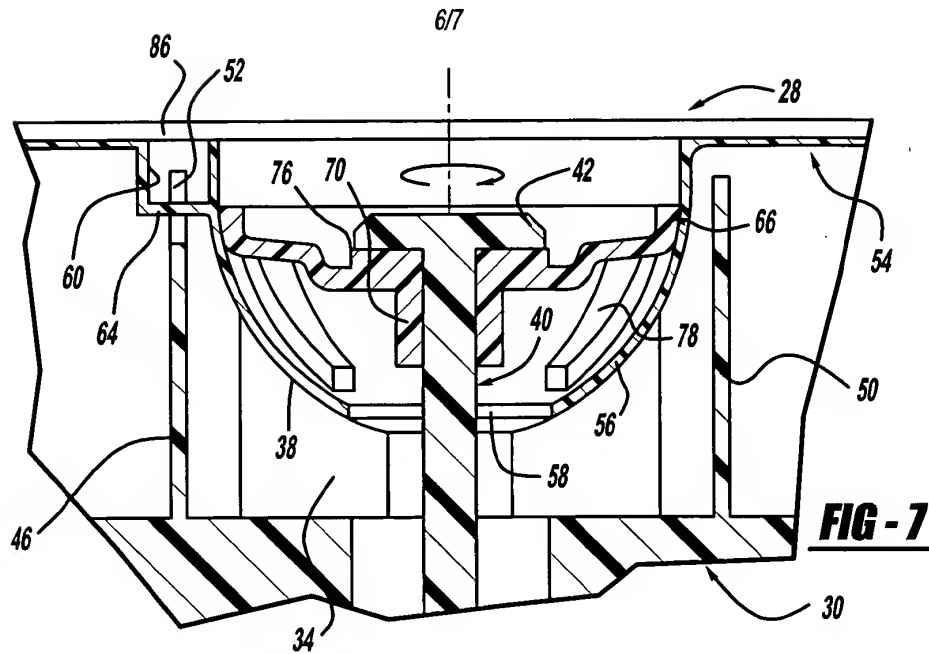




**Title: MIRROR RETENTION SYSTEM**

**Inventor (s) : Paul Henion**

Attorney Docket No. SCH-00084





## APPLICATION DATA SHEET

### **Application Information**

Application Number::	
Filing Date::	
Application Type::	Provisional
Subject Matter::	Utility
CD-ROM or CD-R?::	None
Title Line One::	MIRROR RETENTION SYSTEM
Attorney Docket Number::	SCH-00084
Request for Early Publication::	No
Request for Non-Publication::	No
Suggested Drawing Figure::	2
Total Drawing Sheets::	7
Small Entity::	No
Petition Included?::	No
Secrecy Order in Parent Appl?::	No
Applicant Authority Type::	Inventor
Primary Citizenship Country::	US
Status::	Full capacity
Given Name::	Paul
Middle Name::	R.
Family Name::	Henion
City of Residence::	Port Huron
State or Province of Residence::	MI
Country of Residence:	US
Street of mailing address::	3071 Riverwood Heights
City of mailing address::	Port Huron
State or Province of	

Mailing address:: MI  
Country of mailing address:: US  
Postal or Zip Code of  
mailing address: 48060

### Correspondence Information

Correspondence Customer Number::  
Name:: Warn, Burgess & Hoffmann, P.C.  
Street of mailing address:: P.O. Box 70098  
City of mailing address:: Rochester Hills  
State or Province of mailing  
address:: MI  
Country of mailing address:: US  
Postal or Zip Code of mailing  
address:: 48307  
Phone number:: (248) 364-4300  
Fax number:: (248) 364-4285  
E-Mail address:: [warn@wbhiplaw.com](mailto:warn@wbhiplaw.com)

### Representative Information

Representative Designation::	Registration Number::	Representative Name::
Primary	32775	Philip R. Warn
Associate	35988	Thomas F. Quinn, Jr.
Associate	34985	John A. Miller
Associate	35365	Preston H. Smirman
Associate	33362	Joseph G. Burgess
Associate	33711	Richard W. Hoffmann
Associate	37167	Douglas P. LaLone
Associate	53425	Gregory L. Ozga

**Assignment Information**

Assignee name::	Schefenacker Vision Systems USA Inc.
Street of mailing address::	1855 Busha Highway
City of mailing address::	Marysville
State or Province of mailing address::	MI
Country of mailing address::	US
Postal or Zip Code of mailing address::	48040